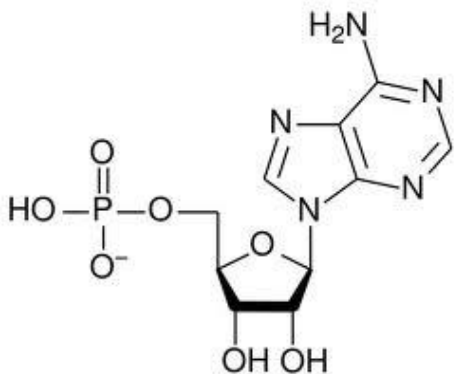


Macromolecules Review Activity

1. What type of macromolecule is this? How do you know? Also, what is a more specific name for this molecule? Is this a monomer, dimer, or polymer?



This is a nucleotide (the monomer of nucleic acids), which is made of three components: a phosphate group (contains a "P" atom and may be represented with a circle on a diagram), a 5-carbon sugar (looks like a pentagon), and a nitrogen base (looks like one ring or two fused rings that contain "N" atoms)

2. Enzymes (molecules that speed up chemical reactions) are an example of this type of macromolecule...

Proteins

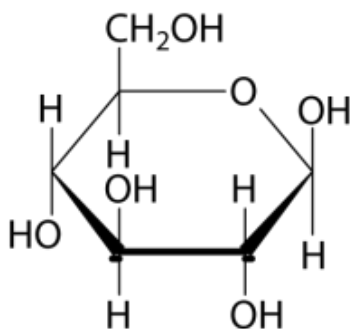
3. What type of macromolecule is used for short term energy and for structure in plant cell walls?

Carbohydrates

4. What type of macromolecule contains the elements carbon, hydrogen, oxygen, nitrogen, and phosphorus?

Nucleic Acids

5. What type of macromolecule is this? How do you know? Also, what is a more specific name for this molecule? Is this a monomer, dimer, or polymer?



6. What type of macromolecule typically contains glycerol and fatty acid chains? (Some people consider these components to be monomers of this macromolecule, and some people do not.)

Lipids

This is a monosaccharide (the monomer of carbohydrates). A monosaccharide is typically shown as a pentagon or hexagon.

7. What type of macromolecule is made up of monomers called amino acids?

Proteins

8. What type of macromolecule has polymers called polysaccharides?

Carbohydrates

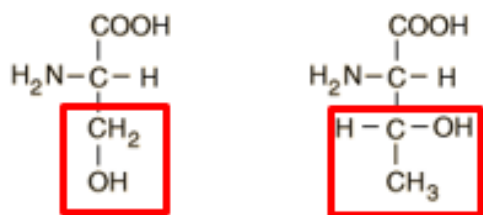
9. What type of macromolecule is used for long-term energy storage, for insulation (i.e. to stay warm), and is found in cell membranes?

Lipids

10. Which of the four macromolecules are considered organic compounds? What does this mean?

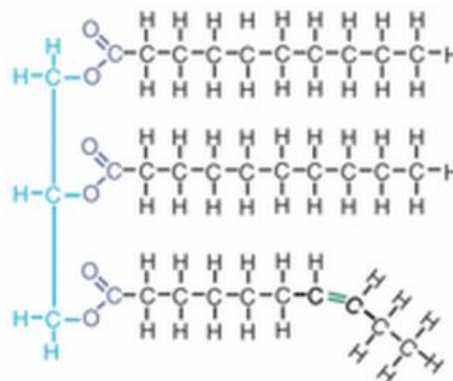
All four macromolecules (carbohydrates, lipids, proteins, and nucleic acids) contain carbon, which makes them organic compounds (aka organic molecules)

11. What type of macromolecule are these? How do you know? Also, what is a more specific name for these molecules? Are these molecules monomers, dimers, or polymers?



These are amino acids (the monomers for proteins), which have a central carbon atom bonded to four things: an amino group (NH₂), a carboxyl group (COOH), a single hydrogen atom, and an R group (the atoms that are in these R groups change from amino acid to amino acid... the R groups are shown in red boxes in the image above).

12. What type of macromolecule is this? How do you know? Is this a monomer, dimer, or polymer?



This is a triglyceride (aka fat), which is one example of a lipid polymer. A triglyceride contains a glycerol (contains 3 C's and 3O's) bonded to three fatty acids (long chains of C's with H's branching off)

13. What type of macromolecule is used for defense, structure, speeding up reactions, transport, movement, etc.?

Proteins have many possible functions, and these are examples of protein functions.

14. What type of macromolecule contains the elements carbon, hydrogen, and oxygen always found in a 1C : 2H : 1O ratio?

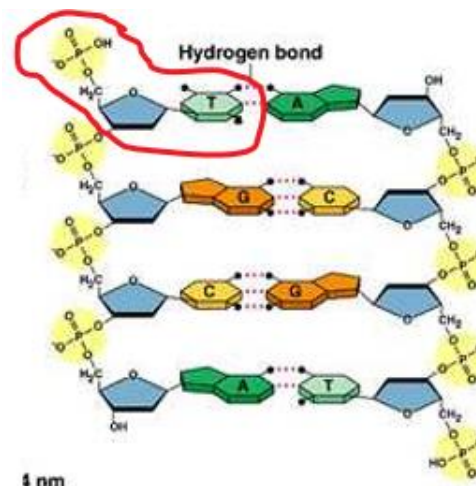
Carbohydrates

15. What macromolecule has polymers called polypeptides?

16. What type of macromolecule is this? How do you know? Also, what is a more

Proteins

specific name for this molecule? Is this a monomer, dimer, or polymer?



This is a DNA molecule (an example of a nucleic acid polymer) because it consists of two chains of nucleotides connected at the middle to create a ladder-like structure. (In real life, the ladder is actually twisted to create a double helix or spiral staircase structure.) A single nucleotide from the DNA molecule is circled in the image. It is recognizable because it is made of a phosphate group (contains a “P” atom and may be represented with a circle on a diagram), a 5-carbon sugar (looks like a pentagon), and a nitrogen base (looks like one ring or two fused rings that contain “N” atoms). In this diagram, the “N” atoms within the nitrogen bases are not labeled. Instead, the four different types of nitrogen bases are labeled with their first letter. The four different types of nitrogen bases are adenine (A), thymine (T), guanine (G), and cytosine (C).

17. What macromolecule has monomers whose names typically end in “-ose?”

Examples of monosaccharides (carbohydrate monomers) include glucose and fructose, whose names end in “ose.”

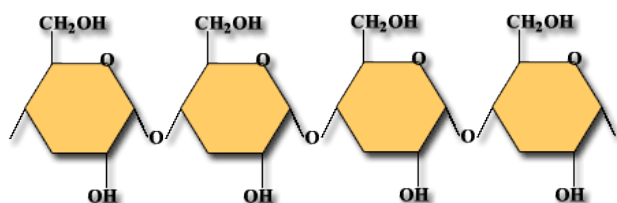
18. Which of the four macromolecules are created using dehydration synthesis? Describe this process.

Polymers of all four macromolecules (carbohydrates, lipids, proteins, and nucleic acids) are formed through dehydration synthesis (joining monomers together to make polymers and losing water in the process).

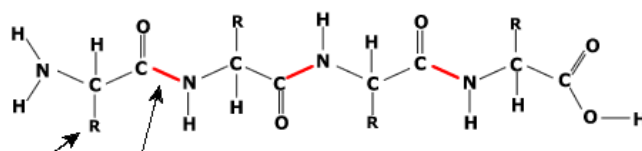
“Dehydration” means “losing water” and “synthesis” means “to build or make,” so dehydration synthesis involves building a polymer by losing water.

19. What type of macromolecule is this? How do you know? Also, what is a more specific name for this molecule? Is this a monomer, dimer, or polymer?

20. What type of macromolecule is this? How do you know? Also, what is a more specific name for this molecule? Is this a monomer, dimer, or polymer?



This is a polysaccharide (the polymer of carbohydrates). A polysaccharide contains several monosaccharides (which look like pentagons or hexagons) linked in a chain.



This is a polypeptide (the polymer of a protein). I know this because I see four R groups, which indicates that there are four amino acids (the monomer of a protein) joined in a chain.

21. Which of the four macromolecules are broken apart using hydrolysis? Describe this process.

Polymers of all four macromolecules broken apart during hydrolysis (breaking apart polymers into monomers by adding water).

"Hydro" means "water" and "lysis" means "to break," so hydrolysis involves breaking apart a polymer by adding water!

22. What type of macromolecule is this? How do you know? Also, what is a more specific name for this molecule? Is this a monomer, dimer, or polymer?

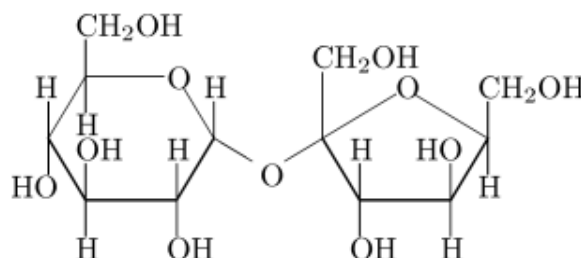


This is a DNA molecule, which is an example of a nucleic acid polymer (along with RNA). We can tell that it's DNA because it has a double helix structure (which looks like a spiral staircase).

23. What type of macromolecule contains mostly carbon and hydrogen atoms with a few oxygen atoms?

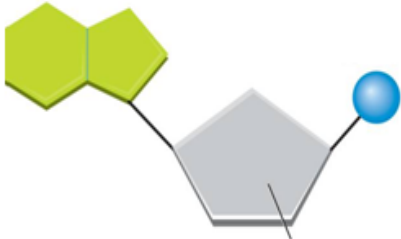
Lipids

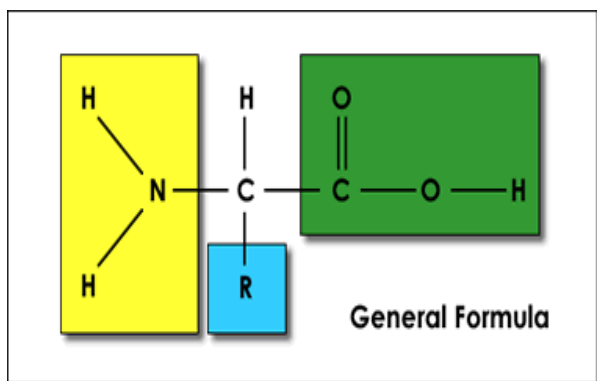
24. What type of macromolecule is this? How do you know? Also, what is a more specific name for this molecule? Is this a monomer, dimer, or polymer?



This is a disaccharide (a dimer of a carbohydrate). Disaccharides contain two monosaccharides (which look like hexagons or pentagons) joined together.

You don't need to know this, but the specific disaccharide shown is sucrose (glucose is on the left and fructose is on the right).

<p>25. What macromolecule has monomers called nucleotides?</p> <p>Nucleic Acids</p>	<p>26. What type of macromolecule contains the elements carbon, hydrogen, oxygen, nitrogen, and sulfur?</p> <p>Proteins</p>
<p>27. What type of macromolecule has polymers that include starch, cellulose, and glycogen?</p> <p>Carbohydrates</p>	<p>28. What type of macromolecule is used to store and transmit (i.e. send) genetic information?</p> <p>Nucleic Acids</p>
<p>29. Label the following parts of the nucleotide pictured below: 5-carbon sugar, phosphate group, and nitrogen base.</p>  <p>The three components of a nucleotide are a phosphate group, 5-carbon sugar, and nitrogen base. Phosphate groups are typically represented by a circle, so the blue circle on the right is a phosphate group. 5-carbon sugars look like pentagons, so the grey pentagon in the middle is a 5-carbon sugar. Nitrogen bases typically look like one ring or two fused rings that have nitrogen atoms in them. In the diagram, the nitrogen atoms are not shown, but we have already identified the phosphate group and 5-carbon sugar, so by process of elimination, the green double-ring on the left is the nitrogen base.</p>	<p>30. What type of macromolecule has polymers that include fats, oils, and waxes?</p> <p>Lipids</p>
<p>31. Label the following parts of the amino acid pictured below: central carbon atom, hydrogen atom, amino group, carboxyl group, R group</p>	<p>32. What type of macromolecule has monomers called monosaccharides?</p> <p>Carbohydrates</p>



Central carbon atom = the carbon atom at the middle of the diagram

Hydrogen atom = the single hydrogen atom bonded to the central carbon atom

Amino group = the portion of the amino acid that is shown in yellow. An amino group has the chemical formula NH_2 .

Carboxyl group = the portion of the amino acid that is shown in green. A carboxyl group has the chemical formula COOH .

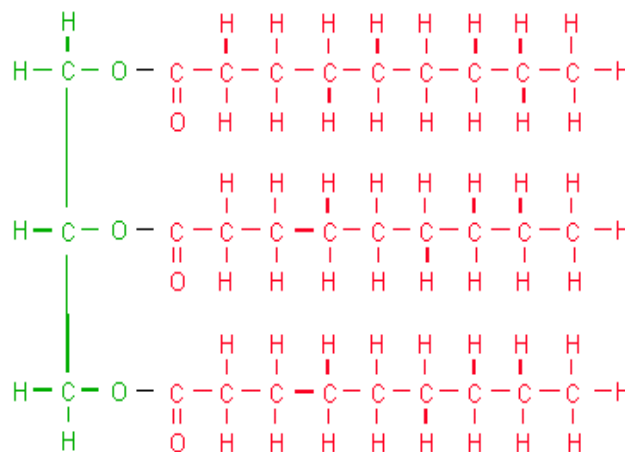
R group = the portion of the amino acid that is shown in blue. There are 20 different amino acids, and each one has different atoms contained within its R group.

Sometimes diagrams simply write "R" to represent the R group of an amino acid (like this diagram), and sometimes they actually show the atoms that are found in the R group of the specific amino acid (see #11).

33. What type of macromolecule has polymers that include DNA and RNA?

Nucleic Acids

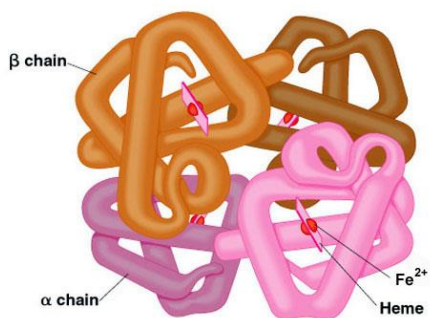
34. Label the following parts of the fat molecule (aka triglyceride) pictured below: glycerol and fatty acids



Glycerol = the portion of the triglyceride shown in green.
Glycerol contains three carbon atoms and three oxygen atoms.

Fatty Acids = the portion of the triglyceride shown in red. Within a triglyceride (aka fat), there are three fatty acids bonded to the glycerol. Fatty acids are long chains of carbon atoms with hydrogen atoms branching off.

35. What type of macromolecule is shown below?



This is a protein because it shows multiple polypeptides folded around each other.

You don't need to know this, but the specific type of protein shown is called hemoglobin. Hemoglobin consists of four polypeptides folded around each other and is located in your red blood cells. Hemoglobin can bind to oxygen and carry it through your blood stream to the different parts of your body.

36. What type of macromolecule has monomers that include glucose and fructose?

Carbohydrates

37. What type of macromolecule has dimers that include sucrose?

Carbohydrates